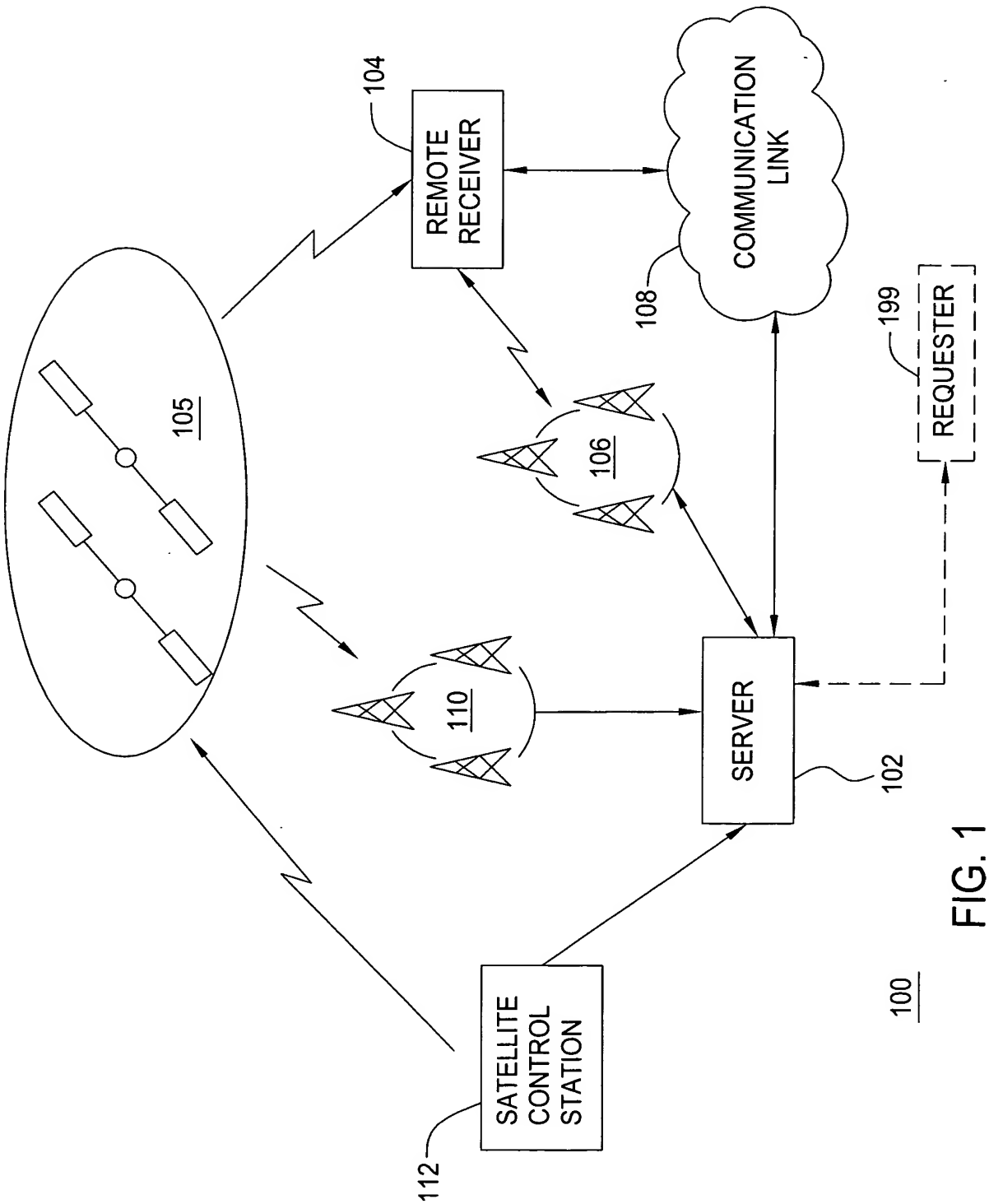
104
REMOTE RECEIVER
COMMUNICATION LINK
108
105
106
199
REQUESTER
110
SERVER
102
SATELLITE CONTROL STATION
112
100

FIG. 1

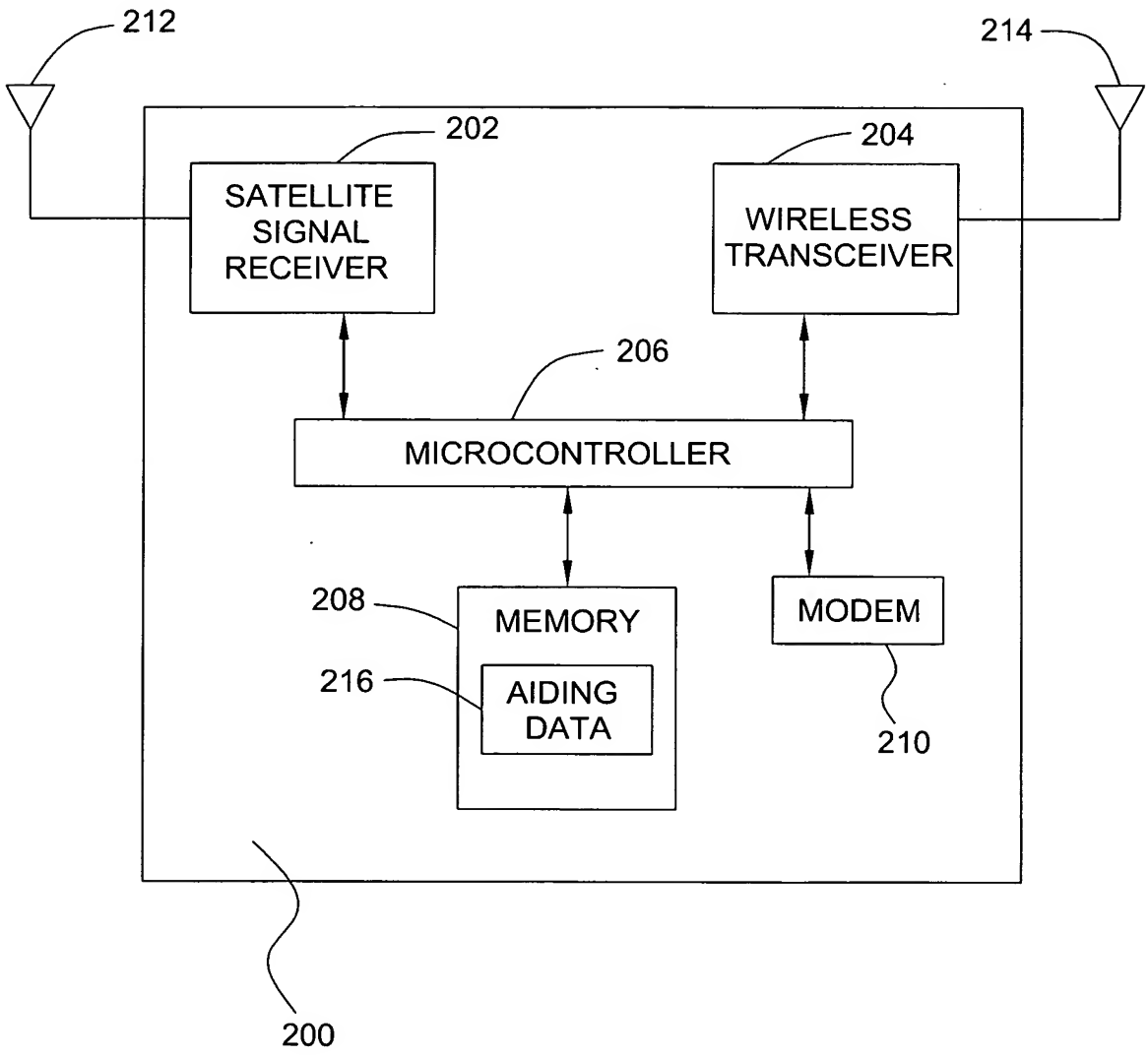
212
214
202
204
SATELLITE SIGNAL RECEIVER
WIRELESS TRANSCEIVER
206
MICROCONTROLLER
208
MEMORY
216
AIDING DATA
MODEM
210
200

FIG. 2

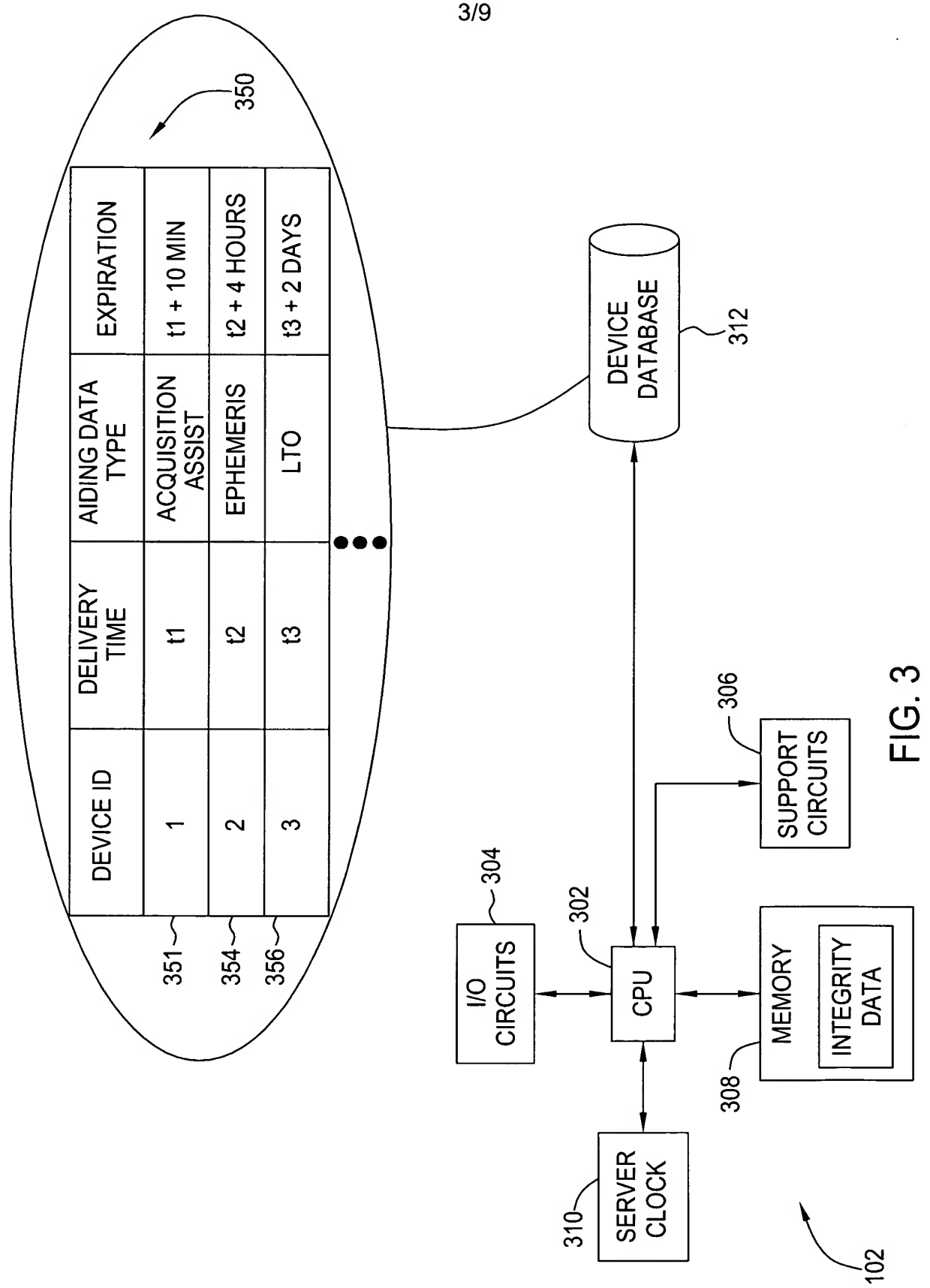
350
DEVICE ID
DELIVERY TIME
AIDING DATA TYPE
EXPIRATION
1
t1
ACQUISITION ASSIST
t1 + 10 MIN
2
t2
EPHEMERIS
t2 + 4 HOURS
3
t3
LTO
t3 + 2 DAYS
351
354
356
DEVICE DATABASE
312
306
SUPPORT CIRCUITS
304
I/O CIRCUITS
302
CPU
MEMORY
INTEGRITY DATA
308
310
SERVER CLOCK
102

FIG. 3

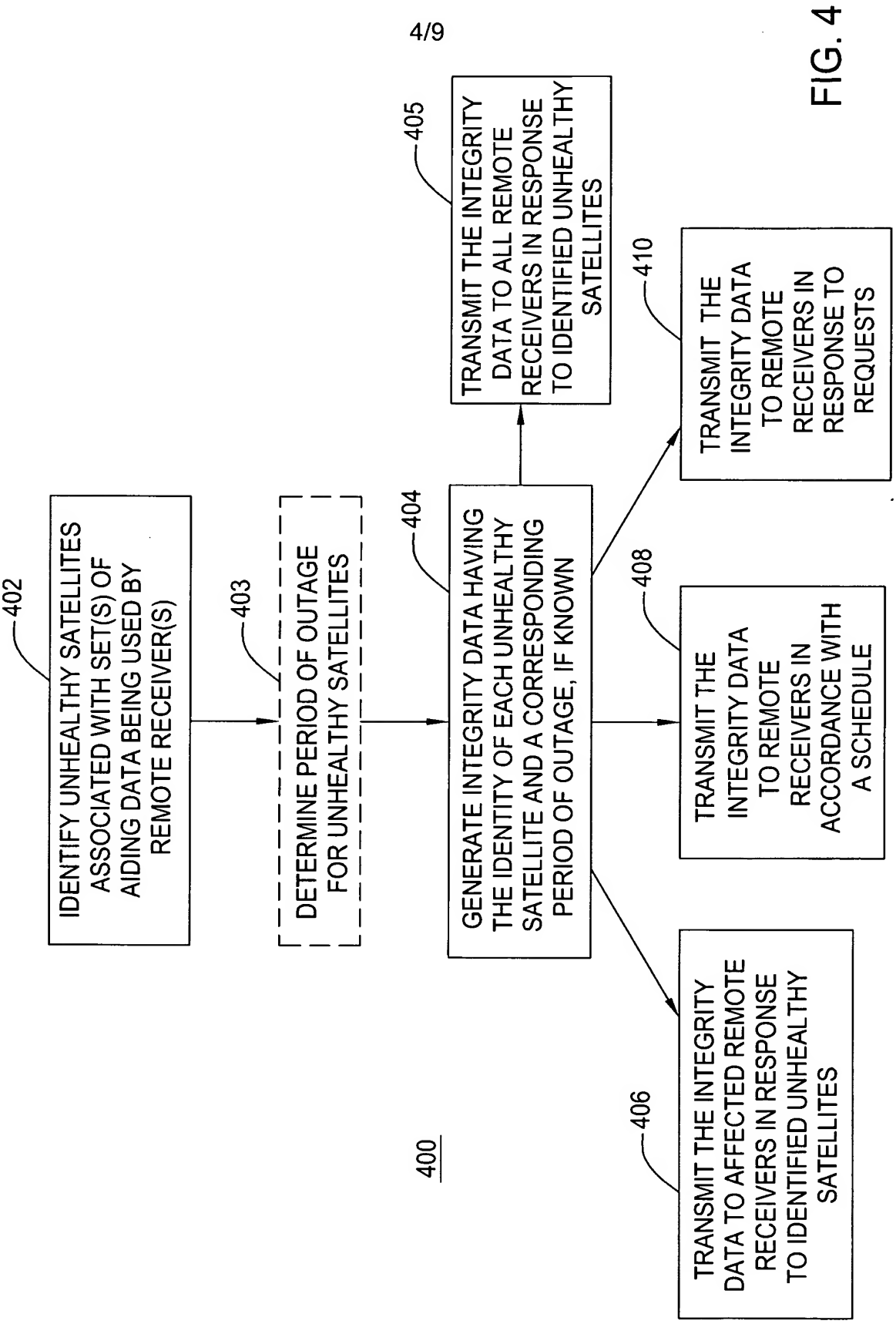
400
402
IDENTIFY UNHEALTHY SATELLITES ASSOCIATED WITH SET(S) OF AIDING DATA BEING USED BY REMOTE RECEIVER(S)
403
DETERMINE PERIOD OF OUTAGE FOR UNHEALTHY SATELLITES
404
GENERATE INTEGRITY DATA HAVING THE IDENTITY OF EACH UNHEALTHY SATELLITE AND A CORRESPONDING PERIOD OF OUTAGE, IF KNOWN
405
TRANSMIT THE INTEGRITY DATA TO ALL REMOTE RECEIVERS IN RESPONSE TO IDENTIFIED UNHEALTHY SATELLITES
406
TRANSMIT THE INTEGRITY DATA TO AFFECTED REMOTE RECEIVERS IN RESPONSE TO IDENTIFIED UNHEALTHY SATELLITES
408
TRANSMIT THE INTEGRITY DATA TO REMOTE RECEIVERS IN ACCORDANCE WITH A SCHEDULE
410
TRANSMIT THE INTEGRITY DATA TO REMOTE RECEIVERS IN RESPONSE TO REQUESTS

FIG. 4

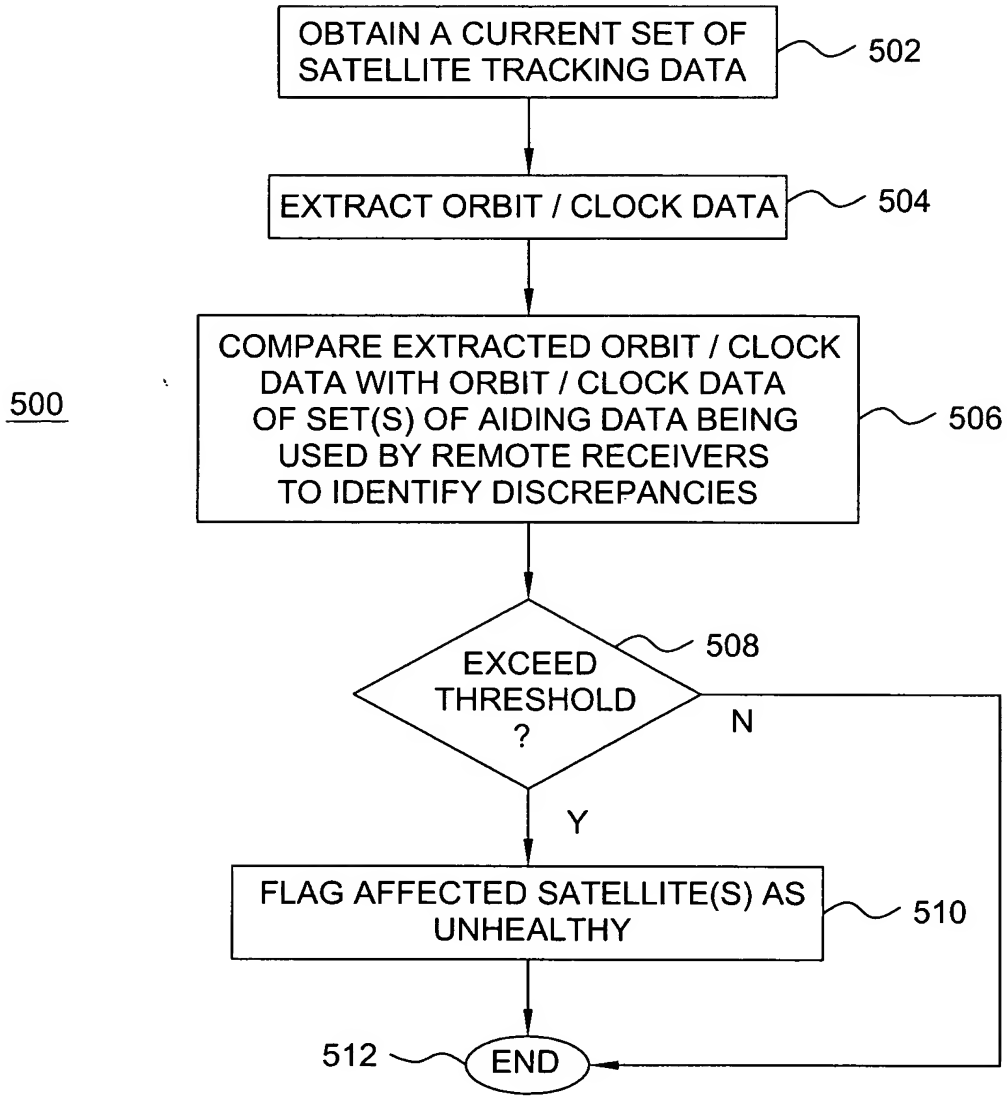
500
OBTAIN A CURRENT SET OF SATELLITE TRACKING DATA
502
EXTRACT ORBIT / CLOCK DATA
504
COMPARE EXTRACTED ORBIT / CLOCK DATA WITH ORBIT / CLOCK DATA OF SET(S) OF AIDING DATA BEING USED BY REMOTE RECEIVERS TO IDENTIFY DISCREPANCIES
506
EXCEED THRESHOLD ?
508
N
Y
FLAG AFFECTED SATELLITE(S) AS UNHEALTHY
510
512
END

FIG. 5

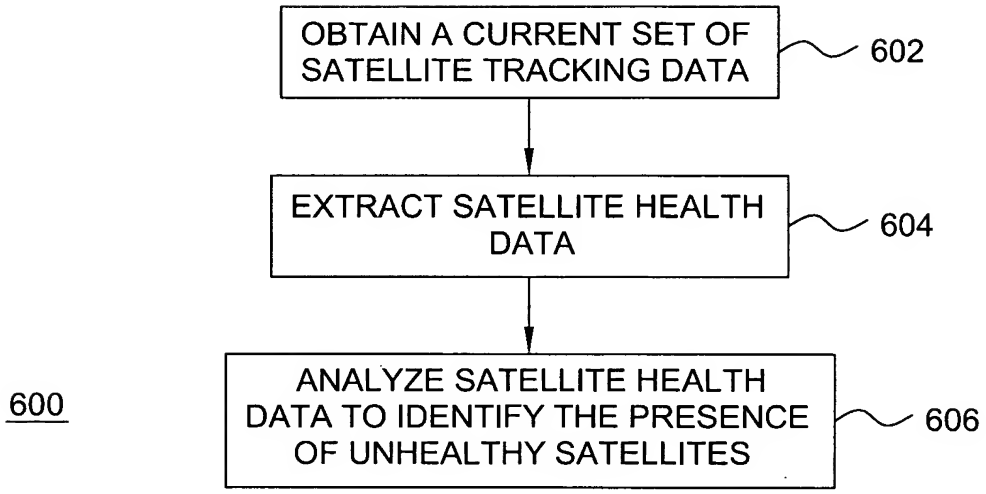
OBTAIN A CURRENT SET OF SATELLITE TRACKING DATA
602
EXTRACT SATELLITE HEALTH DATA
604
ANALYZE SATELLITE HEALTH DATA TO IDENTIFY THE PRESENCE OF UNHEALTHY SATELLITES
606
600

FIG. 6

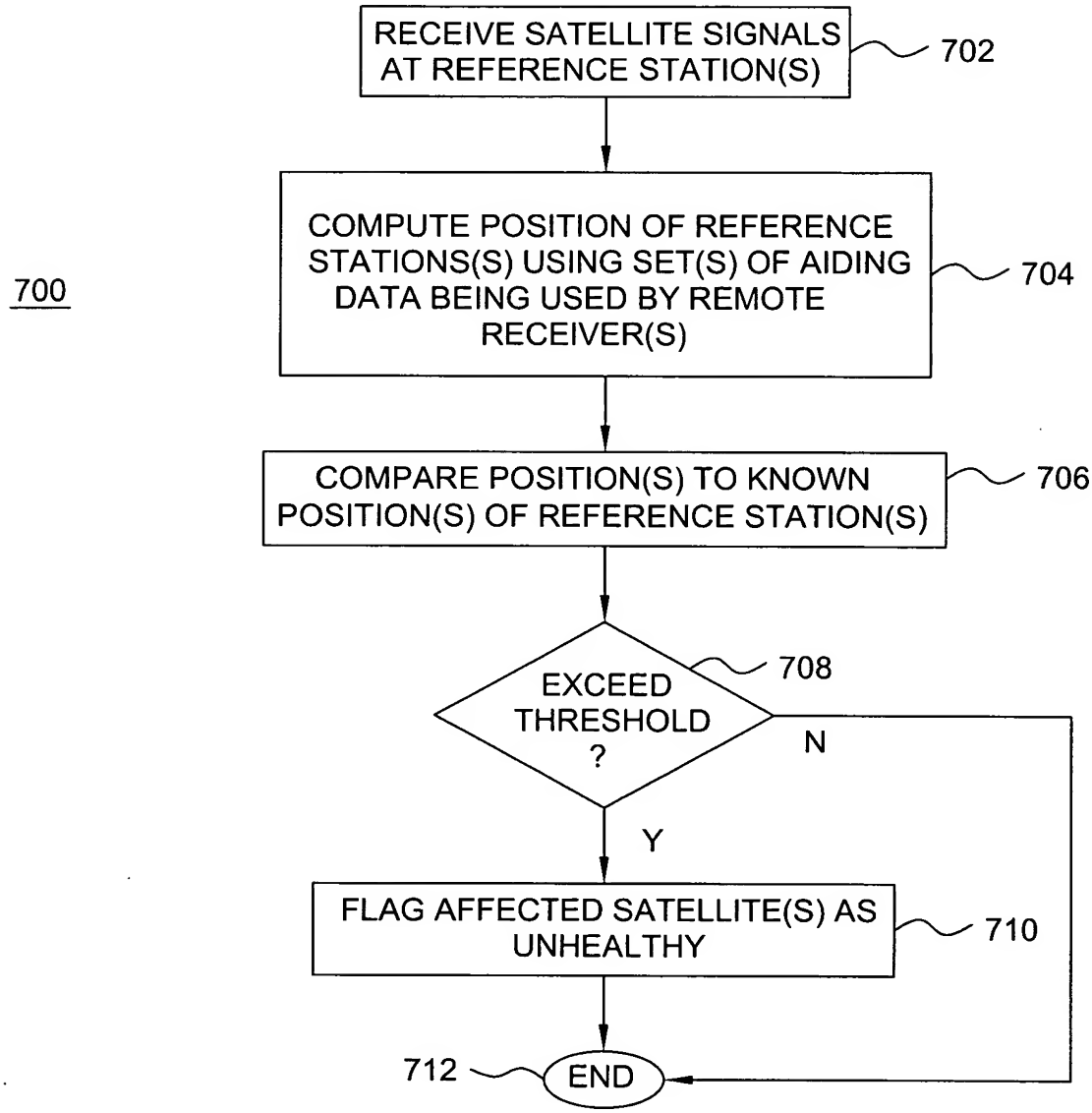
700
RECEIVE SATELLITE SIGNALS AT REFERENCE STATION(S)
702
COMPUTE POSITION OF REFERENCE STATIONS(S) USING SET(S) OF AIDING DATA BEING USED BY REMOTE RECEIVER(S)
704
COMPARE POSITION(S) TO KNOWN POSITION(S) OF REFERENCE STATION(S)
706
EXCEED THRESHOLD ?
708
N
Y
FLAG AFFECTED SATELLITE(S) AS UNHEALTHY
710
712
END

FIG. 7

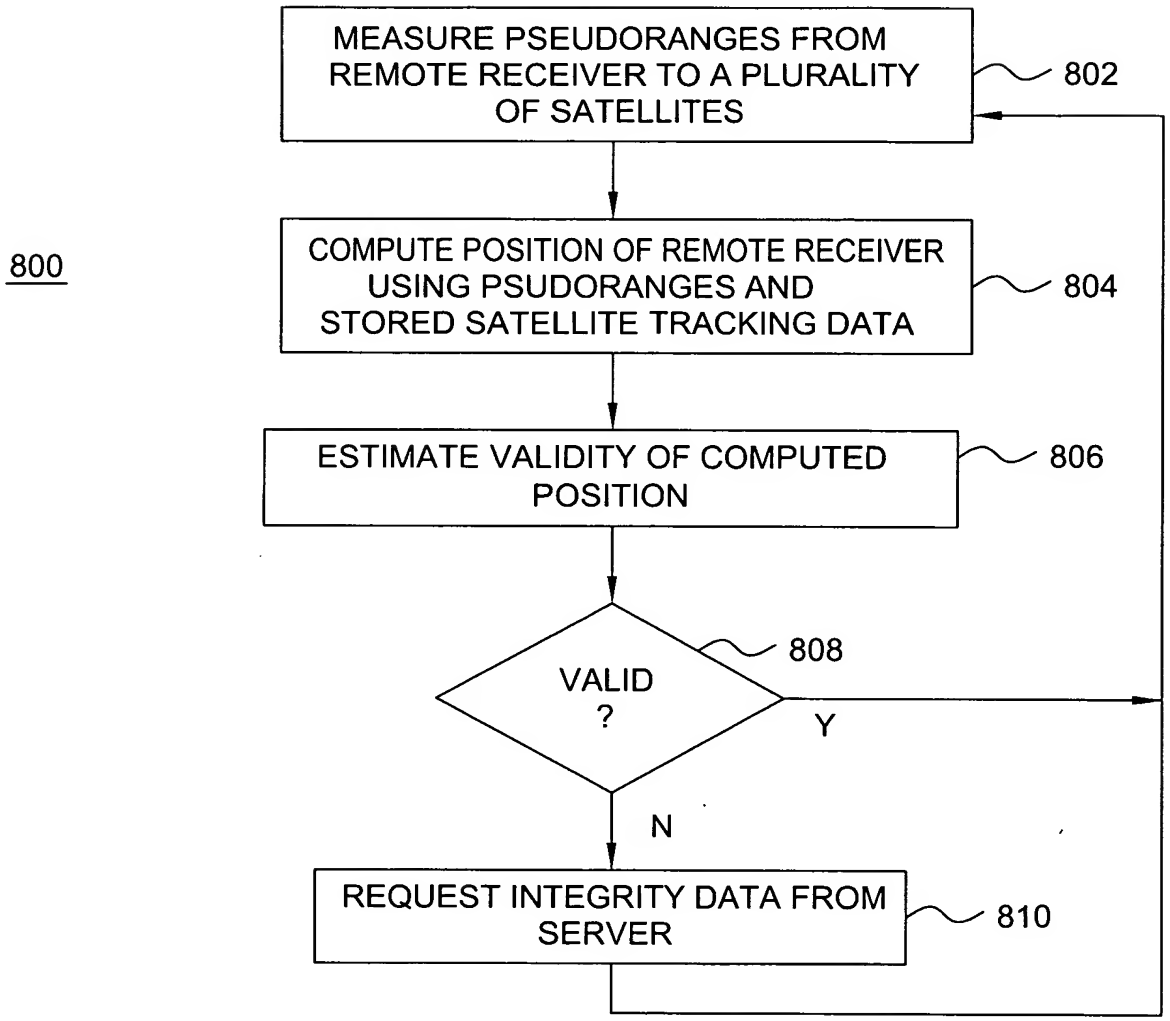
800
MEASURE PSEUDORANGES FROM REMOTE RECEIVER TO A PLURALITY OF SATELLITES
802
COMPUTE POSITION OF REMOTE RECEIVER USING PSUDORANGES AND STORED SATELLITE TRACKING DATA
804
ESTIMATE VALIDITY OF COMPUTED POSITION
806
VALID ?
808
Y
N
REQUEST INTEGRITY DATA FROM SERVER
810

FIG. 8

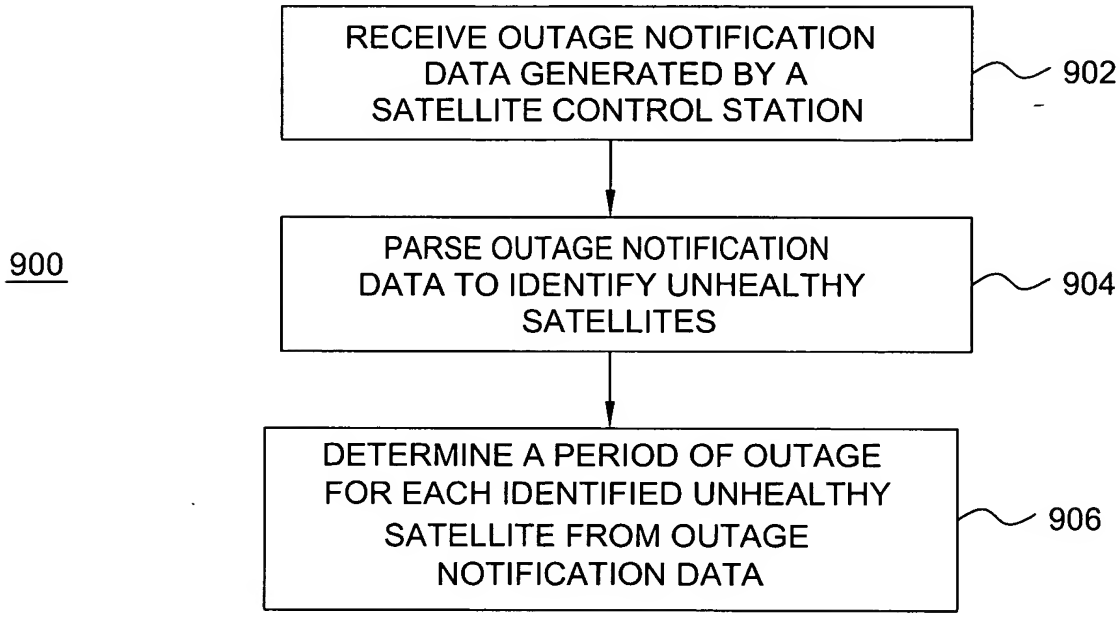
900
RECEIVE OUTAGE NOTIFICATION DATA GENERATED BY A SATELLITE CONTROL STATION
902
PARSE OUTAGE NOTIFICATION DATA TO IDENTIFY UNHEALTHY SATELLITES
904
DETERMINE A PERIOD OF OUTAGE FOR EACH IDENTIFIED UNHEALTHY SATELLITE FROM OUTAGE NOTIFICATION DATA
906

FIG. 9